INSTRUCTIONS FOR THE USE OF

LAWSON PERSPECTIVE CHARTS

REVISED EDITION with English or Metric Units

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The purpose of these charts is to make possible the accurate construction of perspective drawings without the delay and drudgery usually required for that work. They are designed to be of use primarily to the architect and the interior and industrial designer; that is, to any designer whose work requires giving his client a clear picture of a proposed structure or piece of merchandise, though there is no reason why they should not also be used to make drawings of subjects already in existence.

The charts are divided into two groups. Numbers 1 to 4 have a relatively high horizon and are best suited to the drawing of interiors and individual pieces of furniture and other objects in the same range of sizes. Numbers 5 to 8 have a relatively low horizon, and for this reason are best suited to the drawing of building exteriors and large objects in general.

Charts 1 and 5 are calculated for a 45-degree angle of view and should be used where it is desired to show front and one side of an object with equal prominence. Charts 2 and 6 are calculated for a subject inclined 30 degrees to the picture plane (60 degrees to the line of sight) and should be used where it is necessary to show the front (rear for interiors) quite prominently, and enough of the *right-hand* side to make the picture clear. Charts 3 and 7 are similarly designed, but with opposite inclination, so that the front and *left-hand* sides will be shown. Charts 4 and 8 are in parallel or "one-point" perspective and are meant for subjects where one plane is of primary interest and the adjacent sides secondary.

In using any of the charts, the first step is to choose a scale appropriate to the subject matter. The following gives alternate recommendations: one for objects dimensioned in feet and inches; the other for objects dimensioned in metric units.

PROCEDURE FOR CHARTS 1 TO 4

1. Assign some convenient value to the units of measurement on the chart. *When dimensions are in feet and inches,* it will be found that six inches per unit is the most convenient for all-around work, although for room interiors a value of five per unit is better, and for small individual objects, values of three, two, or even one inch per unit may be most useful (e.g., lamps, table radios, etc.). For extremely small objects, values of one-half inch to the unit will give actual-size pictures, and one-quarter-inch or less to the unit will produce magnified pictures.

When dimensions are in metric units, it will be found that 15 centimeters per unit is the most useful for all-around work, and the white dots in the vertical measuring line make it easy to mark off 5-centimeter increments. However, for room interiors a value of 12.5 centimeters per unit is better, and, for small individual objects (e.g., lamps, table radios, etc.) values of 7.5, 5 centimeters or even less per unit may be useful. A value of 5 *millimeters* per division will produce magnified pictures.

2. Before starting work, make sure that the vertical center line is aligned with the vertical of your triangle; then lay a sheet of tracing paper over the chart and lay out the floor plan of the object to be drawn, using the chart as though it were a large floor or table marked off in measured units of whatever size you have previously assigned to them. For convenience in counting, every fifth line is made heavy. To avoid distortion, the extremities of this floor plan should be approximately equidistant from each side of the chart; in other words, the center of the picture area should lie somewhere near the middle of the chart. Bringing the plan forward (i.e., nearer the bottom of the chart) will result in making the picture larger and the perspective sharper; moving it back will have the opposite effect. Some experimenting will probably be necessary at this point, to determine the position of this plan so as to include all essentials and avoid the superfluous.

3. *Project all heights* from the vertical measuring line in the center of the chart. To facilitate this, the lines passing through the base of this line are made extra heavy. If Figure 1 (printed on translucent paper) is laid on chart 2, on which it was originally made, the method of doing this will be obvious. Figure 3, made on chart 3, shows the same method with metric dimensions. Each vertical unit is the perspective equivalent of each horizontal unit.

Since all vertical lines remain vertical in the perspective, these lines may be put in with T-square and triangle. Where a chart is to be in fairly continuous use, it may be convenient to tape it down to a separate drawing board set aside for the purpose, eliminating the delay of aligning the verticals each time the chart is to be used.

4. Once the vertical and horizontal measurements have been made, the rest of the procedure is similar to the making of any perspective drawing, except that it is unnecessary to locate vanishing points lying outside the charts as there are sufficient guide lines running toward those points to make estimating the inclination of intermediate lines easy and accurate. Furthermore, any horizontal measurement not found in the floor plan may be located on the ground plane and projected from there up to its correct position.

PROCEDURE FOR CHARTS 5 TO 8

1. Although the basic procedure is the same as for charts 1 to 4, charts 5 to 8 are intended primarily for building exteriors and large structures in general, and must be used somewhat differently, especially in choosing suitable values for the measuring units. As before, alternate recommendations are given for dimensions in feet and in metric units. To facilitate counting, every tenth line is heavy.

When dimensions are in feet and inches, the most convenient value for houses and low commercial buildings is one foot per unit. This puts the horizon at five feet above ground, about the average

eye level of a standing person. For taller structures, two or more feet per unit will be necessary. This has the effect of raising the eye level as would be the case with someone viewing the building from an above-ground floor of a nearby building. Figure 4, which is in metric dimensions, is an example of this.

When dimensions are in metric units, the most convenient scale value for houses and low commercial buildings is 30 centimeters per scale unit. This puts the horizon at 150 centimeters, about the average for a standing adult. For taller structures, 20, 50, or 100 centimeters per unit will be necessary. This has the effect of raising the eye level as though the structure were viewed from an above-ground floor of another building. Figure 4 (reduced from original size) is an example. It was laid out on chart 5 at a scale of 20 centimeters per unit, putting the horizon 2 meters above ground.

2. As with charts 1 to 4, first make sure that the vertical center line of the chart is aligned with the vertical leg of your triangle, then lay a sheet of tracing paper, large enough to reach the upper border, on the chart. Since the smaller size of the individual units and the relatively lower horizon make it impossible to obtain accuracy and clear measurement on the ground plane, an imaginary plane is passed through a point 50 units above the ground. The floor or ground plan should be laid out on this, then projected *down* to the ground plane.

3. As with charts 1 to 4, all heights must be projected from the vertical measuring line. To facilitate this, the lines passing through the base of this line are made extra heavy. Figure 2 is printed on translucent paper. Laying it on chart 7, on which it was originally made, will show how this is done.

4. Once the vertical and horizontal measurements have been made, the rest is similar to the making of any perspective drawing, but it is unnecessary to locate vanishing points beyond the borders of the charts as there are sufficient guide lines to make estimating the inclination of intermediate lines easy and accurate.

AVOIDING ERRORS

Most errors in the use of the charts can be traced to one of two sources. One is the attempt to transfer vertical measurements directly instead of by projection. This leads to obvious absurdities in the resultant drawing and is consequently easily detected. The other, mentioned earlier, is allowing too much of the floor plan to fall to the right or left of the middle of the chart. Remember that the area that is to show in the final picture must have its center fairly near the middle of the chart. Neglect of this results in some horizontal measurements appearing too small while others appear too large.

It is suggested that, until some experience in use of the charts has been gained, a preliminary rough drawing or two be made for each picture, in order to determine the best position for the floor plan, to check whether all desired material is included, and to help decide on the most convenient value for units of measurement.

DESIGNING ON THE CHARTS

It will sometimes be found possible to design in perspective on a chart and then, by reversing the measurement procedure, to determine dimensions for subsequent construction of working drawings. It will also be found, with practice, that it is possible to make complete perspectives from nothing more than a complete set of dimensions, if no working drawings are available.

VARIATIONS

Birds-Eye View. Sometimes a birds-eye view of a building is wanted, or a view of a small object that emphasizes the top plane, which is the same problem except for scale. For this purpose charts 5 to 8 may be used upside down, if it is kept in mind that the numbers on the vertical measuring line will then be reversed, zero instead of 50, 10 instead of 40, etc. Figure 5 shows the same simple cottage as figure 2 but with the elevated measuring plane of chart 6 used as the ground plane. (Note that chart 6, rather than chart 7, which was used for figure 2, makes it possible to show the same two walls.)

In figure 6 (reduced from original size), the control panel of the telephone-call recorder lies in the inverted ground plane, and the vertical measuring line was extended, by means of an attached strip of paper, below the 50-unit mark in order to show the body of the instrument. This drawing was made on chart 7 at a scale of 5 millimeters per unit, and the body extends about 70 millimeters below the plane of the control panel.

Changing the Floor Level. A scale of 5 inches per unit was recommended earlier for room interiors dimensioned in feet and inches, and 12.5 centimeters for interiors with metric dimensions. (The 6-inch or 15-centimeter scale recommended for furniture, etc. puts the horizon at 6¼ feet or about 2 meters, which is above the average person's eye level and therefore makes ceilings and door lintels appear too low.) However, for some interiors, a smaller scale—i.e., more inches or centimeters per unit—or a larger scale may be needed to keep the final drawing to convenient size. The horizontal measuring plane is still used to lay out the floor plan or cross-section of the interior, but the floor plane of the actual interior may be drawn either above or below it, depending on the scale chosen, in order to put the horizon at a natural eye level of about 5 feet or 150 centimeters. Figures 7 and 8 illustrate these methods.

Figure 7 (reduced in size from an original drawn on chart 4) shows a room in which the floor is raised above the base plane of the chart. The chosen scale was 20 centimeters per unit. Eight *inches* per unit would produce the same effect. The floor *plan* was laid out as usual on the base plane of the chart, but the floor *plane* passes through the 5-unit mark on the vertical axis. This has the effect of *subtracting* 5 units from the level of the horizon, putting it at 5 feet or 1.55 meters.

Figure 8, reduced in size from an original drawn on chart 3, uses the opposite approach. Here the scale is 10 centimeters per unit, but the floor plane of the room is located 3 units *below* the base plane of the chart. For this drawing, the vertical measuring line was extended downward, and the floor plan, laid out as usual on the base plane of the chart, "cuts" the wall and furnishings 30 centimeters above the floor. This has the effect of *adding* 30 centimeters to the eye level so that it is a natural 155 centimeters above the floor. For plans and elevations dimensioned in feet, a scale of 8 inches per unit would give practically the same result.

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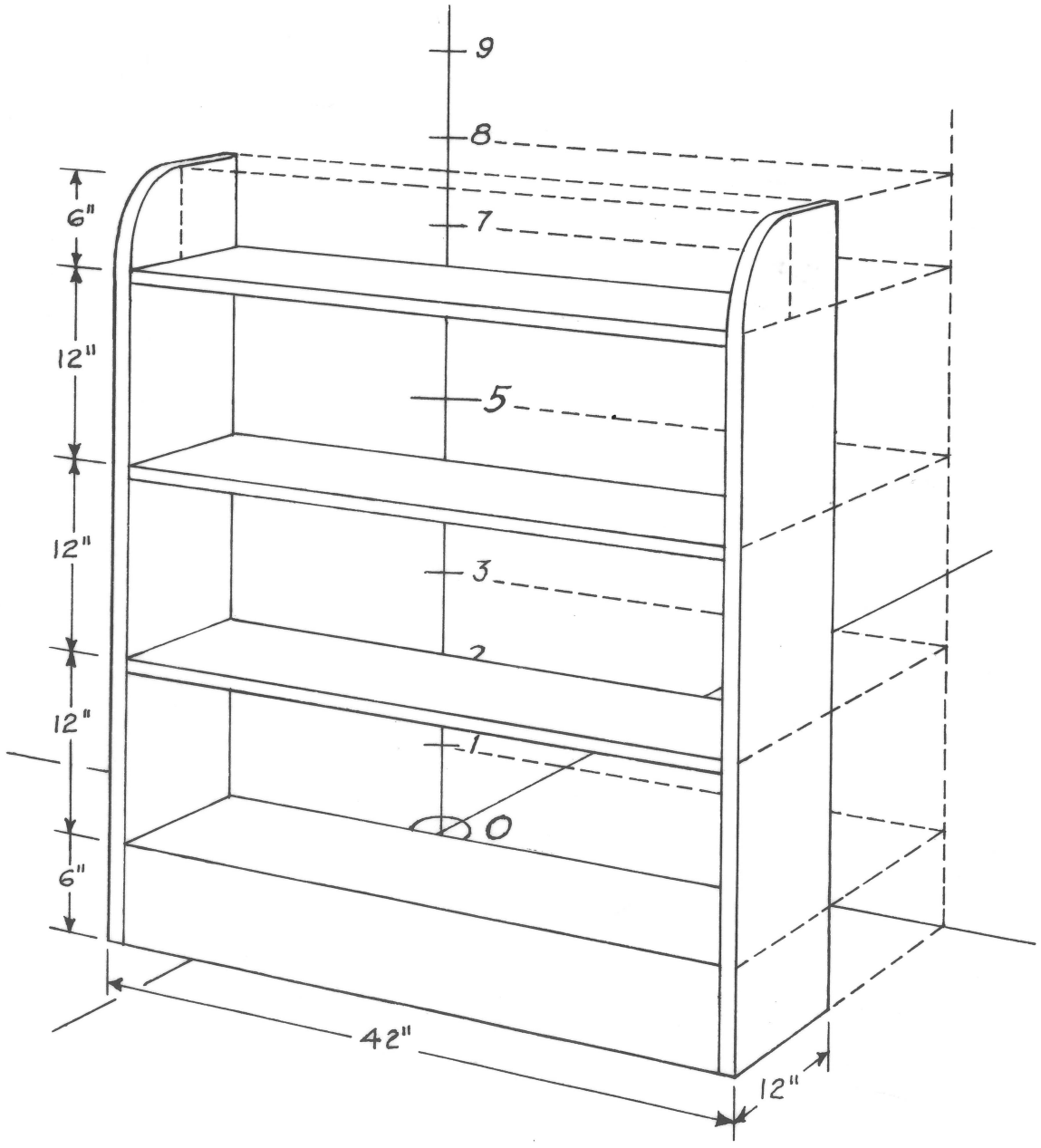


Figure 1

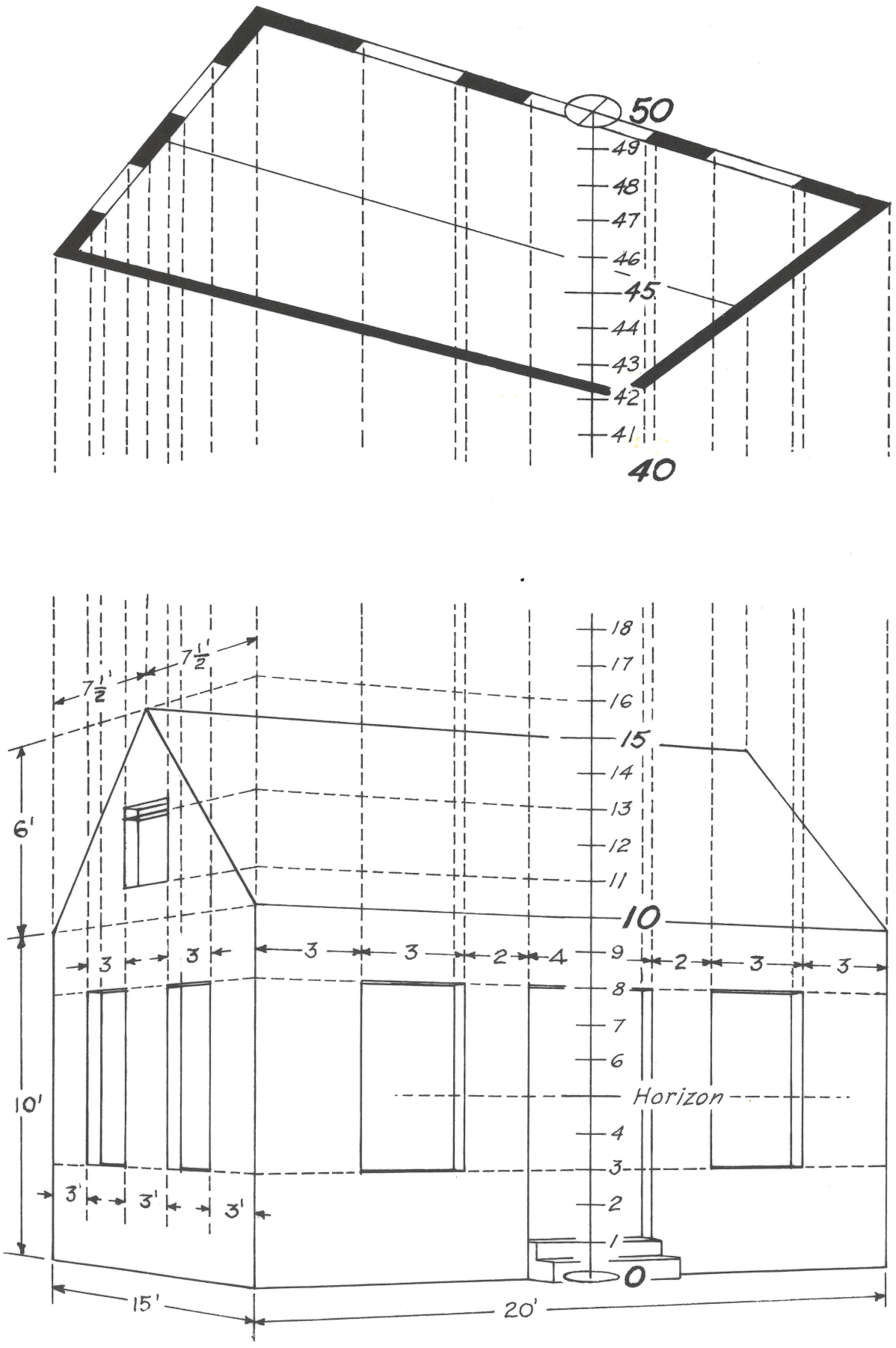

50
49
48
47
46
45
44
43
42
41
40
18
17
16
15
14
13
12
11
10
9
8
7
6
Horizon
4
3
2
1
0
7½'
7½'
6'
10'
3
3
3
3
2
4
2
3
3
3'
3'
3'
15'
20'

Figure 2

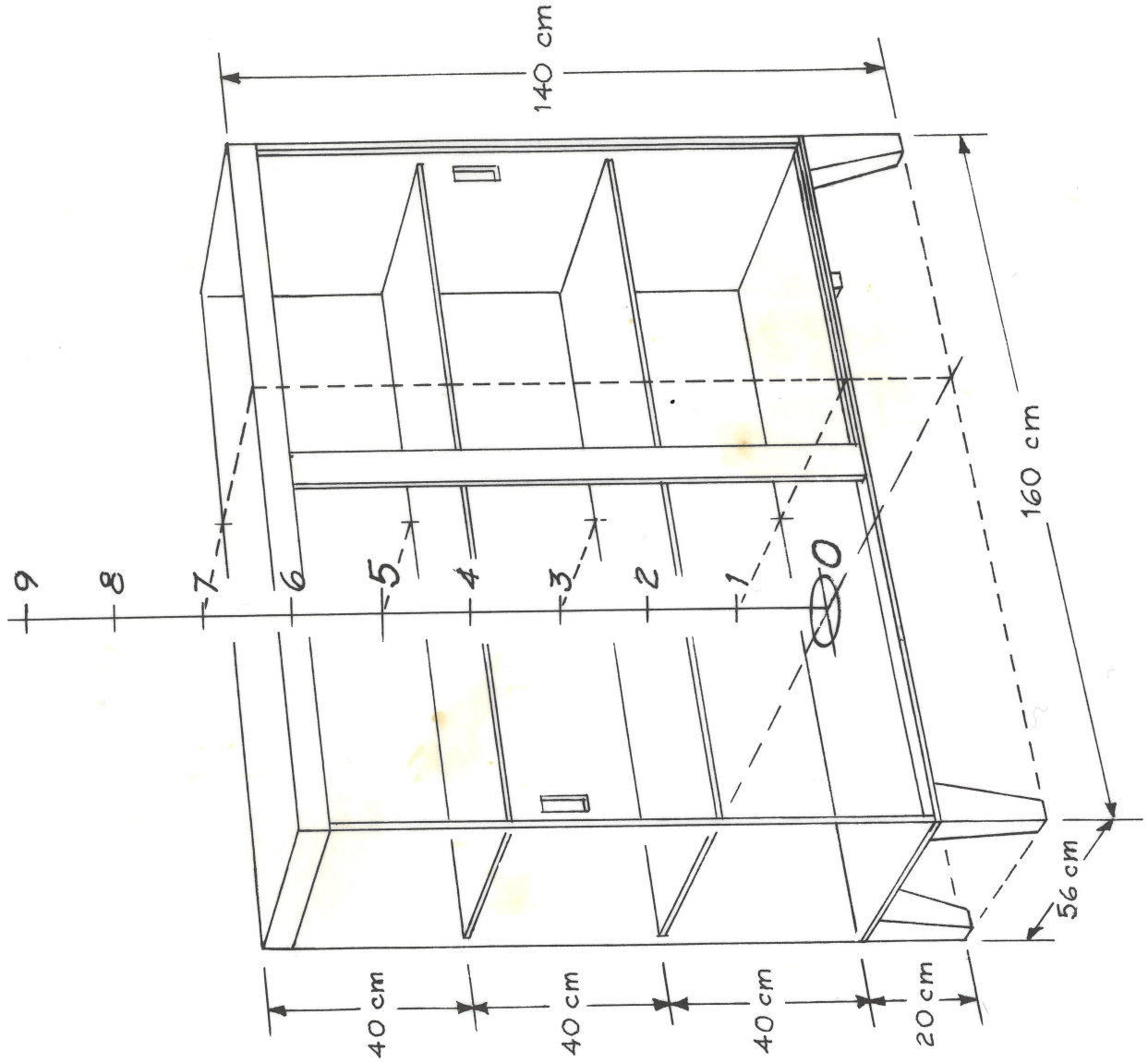


Figure 3

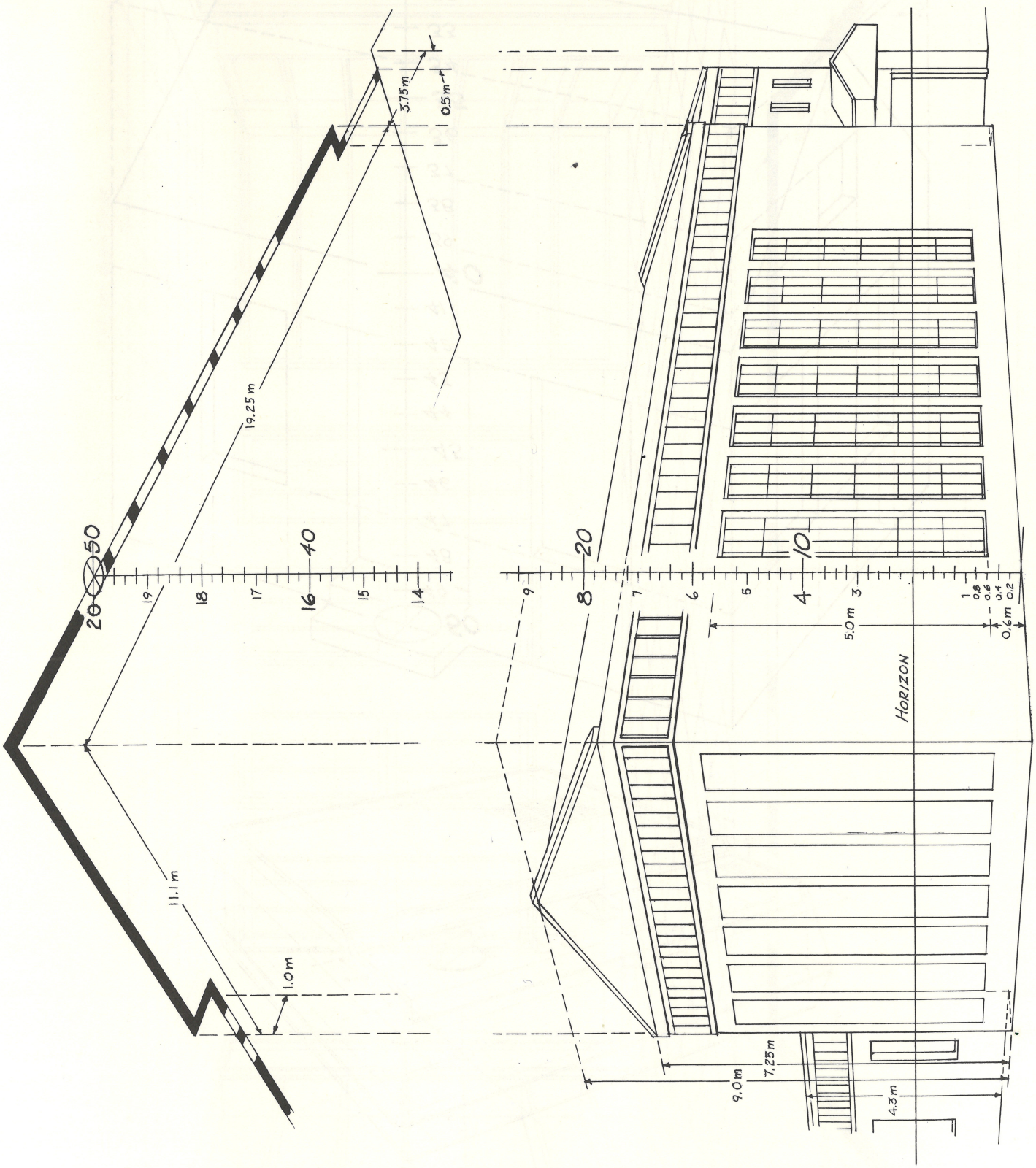
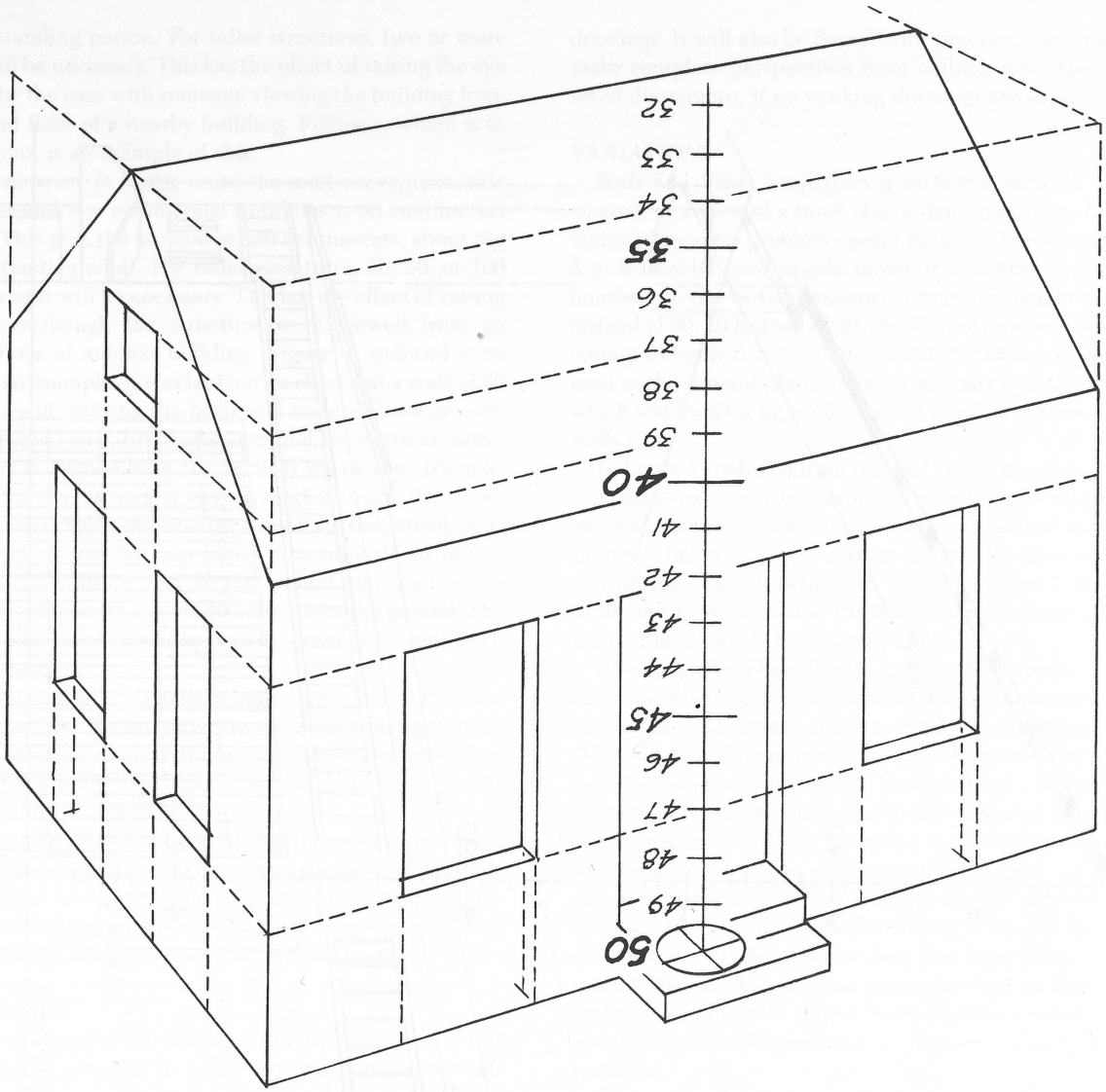


Figure 4

Figure 5



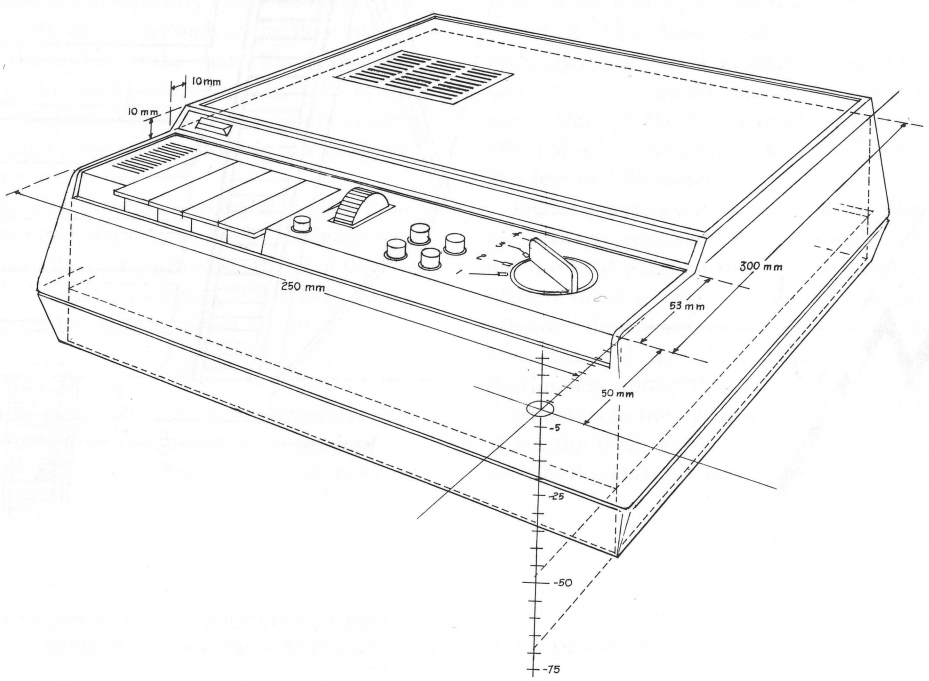


Figure 6

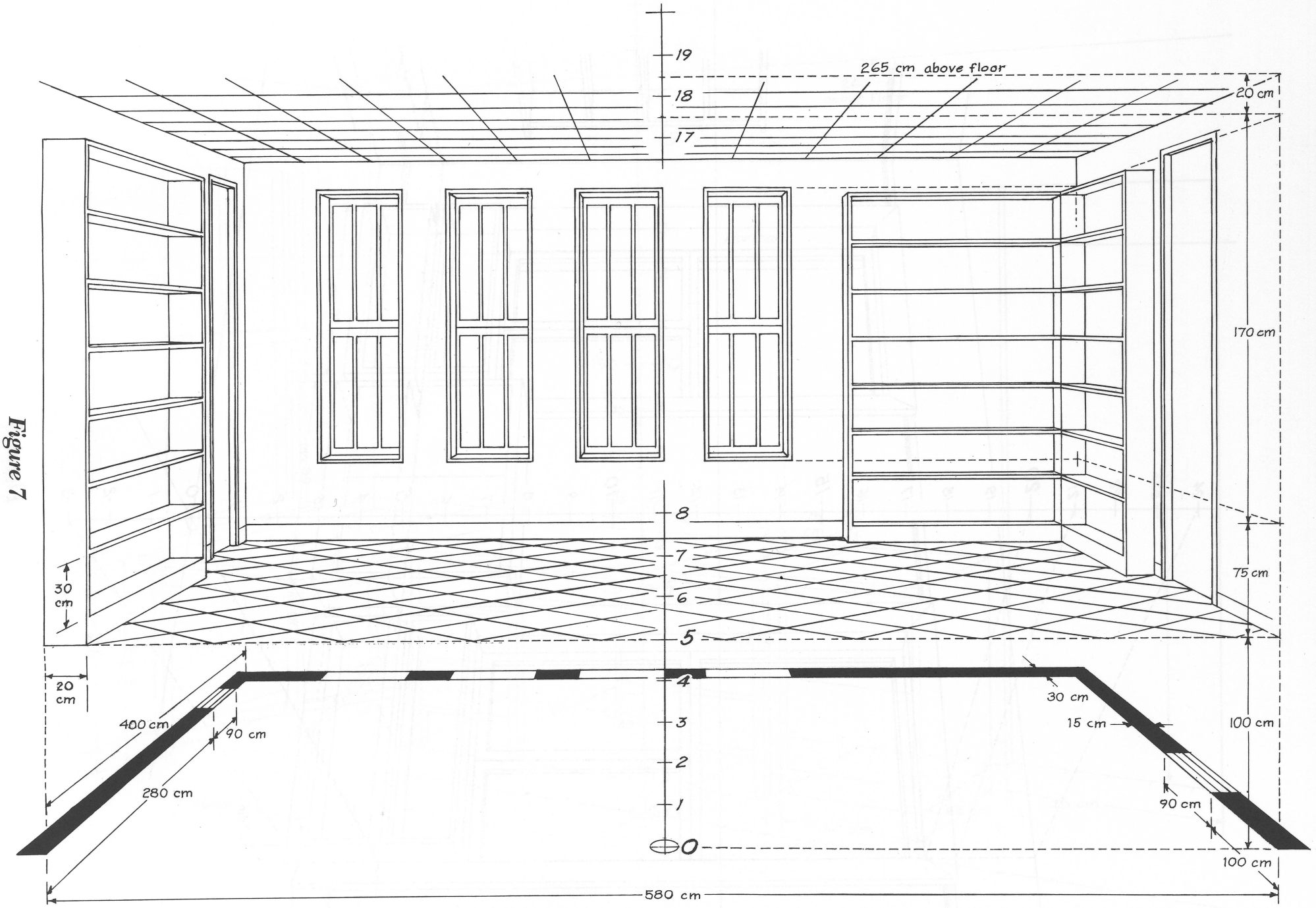
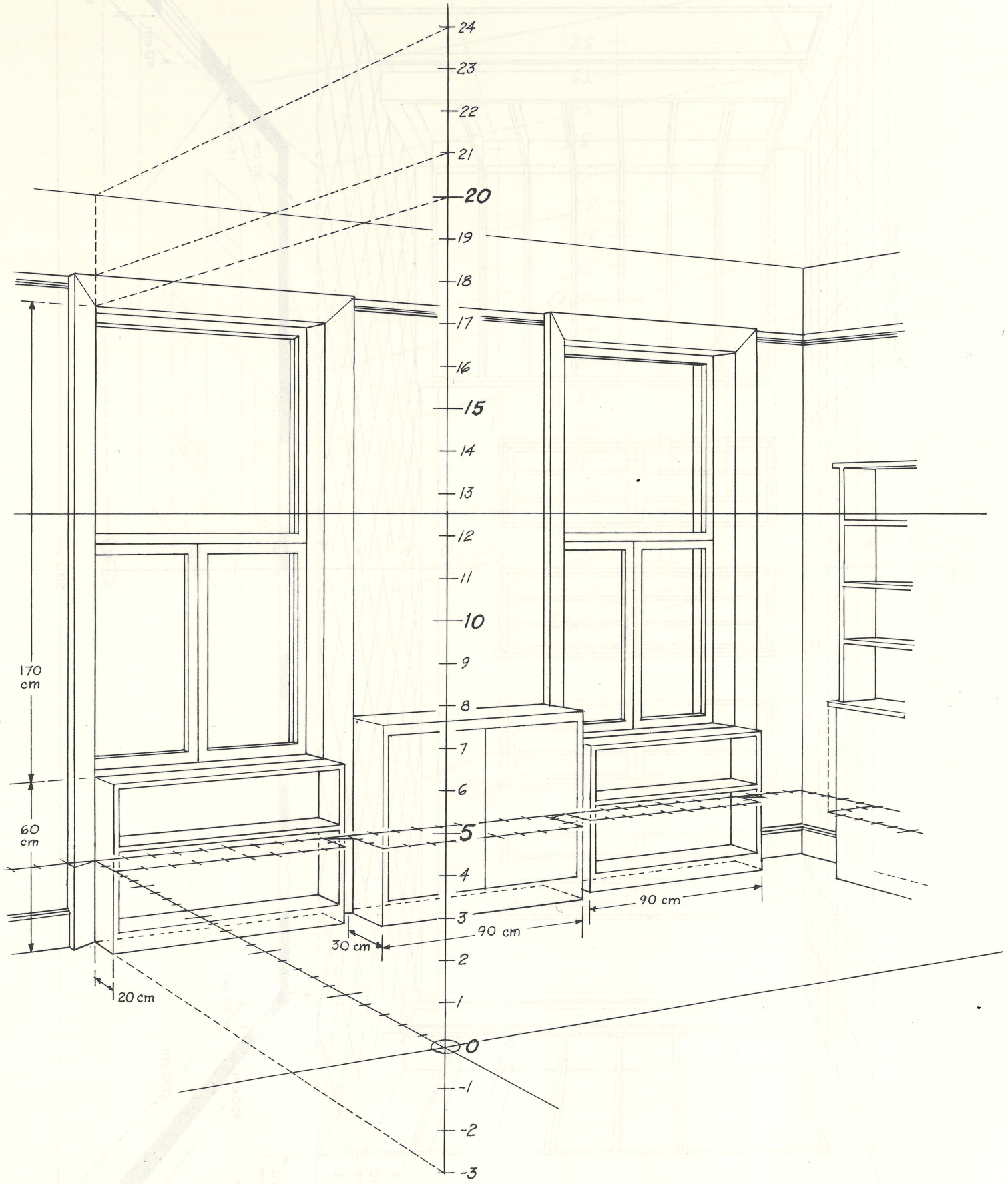

19
18
17
8
7
6
5
4
3
2
1
0
265 cm above floor
20 cm
170 cm
75 cm
100 cm
30 cm
20 cm
400 cm
90 cm
280 cm
30 cm
15 cm
90 cm
100 cm
580 cm

Figure 7


24
23
22
21
20
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18
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16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
-1
-2
-3
170 cm
60 cm
20 cm
30 cm
90 cm
90 cm

Figure 8

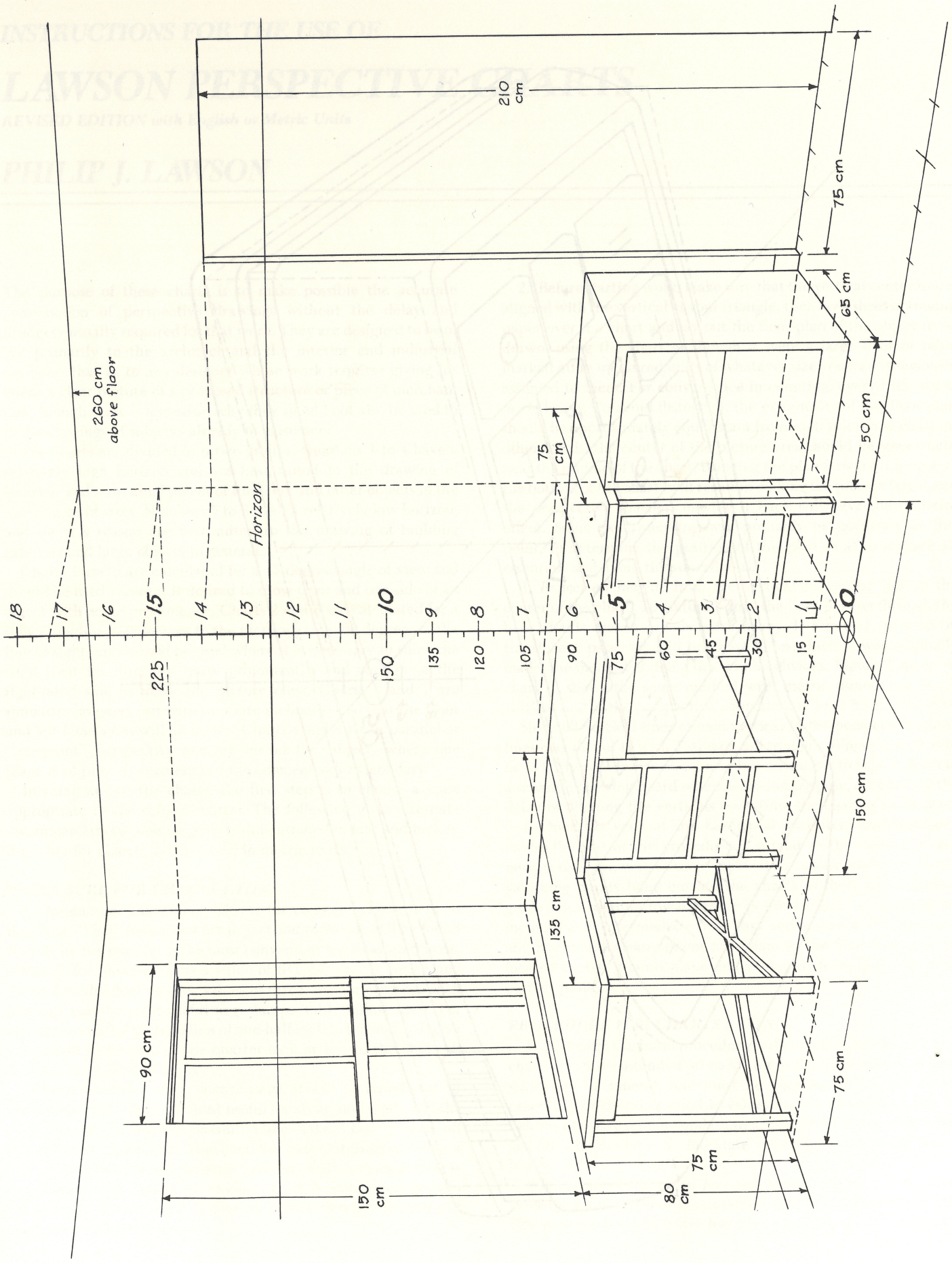
210 cm
75 cm
65 cm
50 cm
260 cm above floor
Horizon
75 cm
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
225
150
135
120
105
90
75
60
45
30
15
150 cm
135 cm
90 cm
75 cm
150 cm
75 cm
80 cm

Figure 9

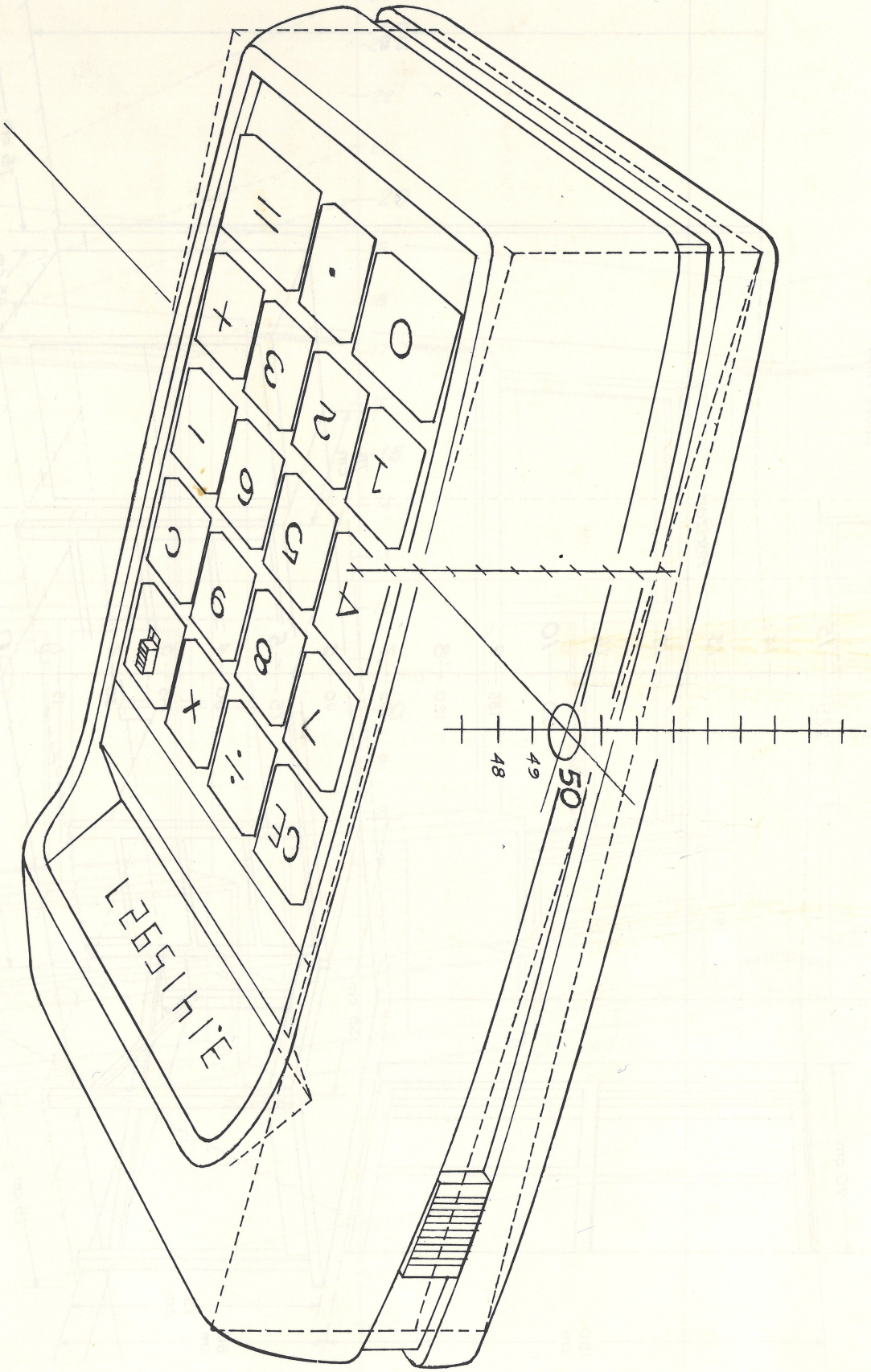

Figure 10